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| ROBERT J. DEPKE LEWIS T. STEADMAN ROCKEY, DEPKE & LYONS, LLC SUITE 5450 SEARS TOWER CHICAGO, IL 60606-6306 | | | EXAMINER LEADER, WILLIAM T | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/765,791

Applicant(s)

SATO ET AL.

Examiner

WILLIAM T. LEADER

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 92-109 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 92-109 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 14, 2008, has been entered.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 92-109 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. Claims 92-109 are directed to apparatus. Claim 92 recites "an object to be polished including a substrate and a film formed over the substrate". Claim 92

further recites “a cathode member relatively small compared with the upper surface of the film”.

6. As explained in MPEP section 2115, the material or article worked upon by an apparatus does not limit apparatus claims. “Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim.” Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, “[i]nclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims.” In re Young, 75 F.2d 996, 25 USPQ 69 (CCPA 1935) (as restated in In re Otto, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)).

7. The limitation relating the size of the cathode member to the article to be polished by the apparatus is indefinite because the apparatus is capable of polishing workpieces of various sizes, and it is not possible to know in advance what size of workpiece is to be treated. Independent claims 95, 102 and 108 include a similar limitation based on the object to be polished or plated.

Claim Rejections - 35 USC § 102

8. Claims 92-109 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang (U.S. 6,447,668).

Wang is interpreted and applied as in the previous office actions. As previously indicated, Wang discloses an electropolishing apparatus which includes:

wafer chuck 29 which serves as a table for holding wafer 31 to be polished (see column 11, lines 8-9 and figures 28A and 28B);

cathode jets 254 which are relatively movable with respect to the wafer 31 and are small with respect to the chuck 29 for holding the wafer 31 (column 37, lines 1-30; figures 28A and 28B and figures 32A and 32B);

means for measuring the voltage and current of the power supply to determine resistance of the layer being etched which corresponds to the thickness (column 12, line 46 to column 14, line 57);

pump 33 for feeding electrolytic solution between a region of the surface of the wafer 31 and the cathode (column 37, lines 18-19 and figures 28A and 28B);

power supply 200 for applying a voltage with the cathode member serving as a cathode and the wafer as an anode (column 37, line 17 and figures 28A and 28B);

moving means for moving the cathode jet 254 to other regions of the surface of the wafer (column 37, line 27) and

control means to turn off power supply 200 when the thickness of the metal layer reaches a set value (column 37, lines 24-26).

9. Figure 47 of Wang illustrates an embodiment configured to be a fully computer-controlled wafer-processing tool (column 49, lines 47-67). Figure 48

depicts the operation of a portion of software for controlling the apparatus. The full computer control means of Wang would have been capable of controlling the application of voltage and the speed of movement of the cathode in the manner recited by applicant.

10. Applicant has amended independent claim 92 to recite a measuring means separate from the cathode member, for measuring data corresponding to a thickness of the film on the object prior to beginning electropolishing. Claim 95 has been amended to recite a similar limitation. As noted above, Wang discloses means for measuring the voltage and current of the power supply to determine resistance of the layer being etched which corresponds to the thickness. At page 11 of the Remarks, applicant argues that Wang discloses that the cathode itself is used to determine a thickness of the film, and notes that the claims have been amended to require that the measuring means be a structure separate from the cathode member. Wang teaches that various techniques can be used to determine the appropriate electropolishing time period. For example, sensors can be used to measure the thickness of the metal layer 121 on the wafer 31. See figures 1A and 7B, and column 24, lines 35-41. Figures 45 and 46 show embodiments configured with an in-situ film thickness uniformity monitor. Sensors 500 can be ultrasonic thickness measurement sensors. These sensors are separate from the cathode. Signals detected from sensors 500 are sent back to computer 502. The in-situ

thickness data can be used to adjust or control polishing uniformity and final thickness. See column 43, lines 7-16.

11. The sensors of Wang are capable of being operated in the manner recited by applicant. As explained in MPEP section 2114, apparatus claims must be structurally distinguishable from the prior art. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original). The manner of operating a device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat.

App. & Inter. 1987) (The preamble of claim 1 recited that the apparatus was “for mixing flowing developer material” and the body of the claim recited “means for mixing ..., said mixing means being stationary and completely submerged in the developer material”. The claim was rejected over a reference which taught all the structural limitations of the claim for the intended use of mixing flowing developer. However, the mixer was only partially submerged in the developer material. The Board held that the amount of submersion is immaterial to the structure of the mixer and thus the claim was properly rejected.).

12. Independent claim 102 recites a calculating unit for calculating the target amount of the film to be removed from thickness data determined prior to beginning electrolytic polishing, and a control means for controlling the application of voltage and the speed of movement of the cathode during electropolishing, based at least in part on the calculated target amount from the calculating unit obtained prior to beginning electropolishing until the target amount of from in each region is removed. By disclosing that the in-situ thickness data can be used to control final thickness, Wang indicates that the apparatus would be capable of performing the function recited by applicant.

13. Claims 95 and 108 are directed to a plating system rather than a polishing system. The difference between the polishing and plating apparatus recited by applicant resides in the polarity of the voltage applied to the apparatus electrodes

and the object being treated. Wang discloses that the apparatus is capable of being used for electroplating as well as electropolishing. Cathodes 1, 2 and 3 are charged positively and wafer 31 is charged negatively, so that wafer 31 is suitably electroplated rather than being electropolished. See column 10, lines 45-56.

14. At page 12 of the Remarks, applicant argues that Wang discloses a discontinuous move and polish method rather than the continuous movement now recited in claims 98 and 99 as amended. The newly added limitations relate to the manner in which the apparatus is used. The apparatus of Wang is capable of being operated in the manner now recited by applicant.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM T. LEADER whose telephone number is (571) 272-1245. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Harry D Wilkins, III/
Primary Examiner, A.U. 1795

/William Leader/
March 29, 2008